Content Protection for Recordable Media Specification

SD Memory Card Book
SD-Video Part

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Preface

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Chapter 1
Introduction

1. Introduction

1.1 Purpose and Scope

The *Content Protection for Recordable Media Specification* (CPRM) defines a robust and renewable method for protecting content stored on a number of physical media types. The specification is comprised of several "books." The *Introduction and Common Cryptographic Elements* book provides a brief overview of CPRM, and defines cryptographic procedures that are common among its different uses. The *SD Memory Card Book* specifies additional details for using CPRM technology to protect content stored on the SD Memory Card, and on other implementations of protected storage with an interface and security system equivalent to that of the SD Memory Card. Note that such other implementations must not provide any external interface to the memory other than one that adheres to the protocols described in this specification.

The *SD Memory Card Book* consists of the following parts, under the general title *CPRM Specification SD Memory Card Book:*

- *Common Part*
- *SD Application Specific Parts (e.g. SD-Audio, SD-Sound, SD-ePublish, SD-Image, SD-Video)*

This document is the *SD-Video Part* of the *SD Memory Card Book,* and describes details of CPRM that are specific to the SD-Video format.

The use of this specification and access to the intellectual property and cryptographic materials required to implement it will be the subject of a license. A license authority referred to as the 4C Entity, LLC is responsible for establishing and administering the content protection system based in part on this specification.

SD-Video has four profiles currently, which are Mobile Video Profile, Personal Video Profile, Entertainment Video Profile and Entertainment Video Recorder Profile. The use of this specification is limited to apply only to Mobile Video Profile, and this profile supports MPEG4 contents. Personal Video Profile and Entertainment Video Recorder Profile are for camera product, and then they need not to support content protection. Entertainment Video Profile supports MPEG2 contents but this profile is currently out of the scope of this specification. It is anticipated that CPRM technology will also be applied to Entertainment Video Profile as described in section 1.4.

1.2 Document Organization

This specification is organized as follows:

- Chapter 1 provides an introduction.
- Chapter 2 lists abbreviations and acronyms used in this document.
- Chapter 3 describes the use of CPRM to protect SD-Video content stored on SD Memory Card media.

1.3 References

This specification shall be used in conjunction with the following documents. When the documents are superceded by an approved revision, the revision shall apply.

4C Entity, LLC, *CPRM license agreement*

4C Entity, LLC, *CPRM Specification: Introduction and Common Cryptographic Elements, Revision 1.0*

4C Entity, LLC, *CPRM Specification: SD Memory Card Book Common Part, Revision 0.96*

4C Entity, LLC, *Content Protection System Architecture White Paper, Revision 0.81*

SD Association, *SD Memory Card Specifications, Part 3: Security Specification, Version 1.01*

SD Association, *SD Memory Card Specifications, Part 8:Video Specifications, Version 1.1*

SD Association, *SD Memory Card Specifications, Part 8:Video Specifications, Version 1.1 Supplemental Information*

1.4 Future Directions

This document currently provides details to using CPRM for the MPEG4 content which is specified by Mobile Video Profile in *SD-Video Part of SD Memory Card Book.* It is anticipated that CPRM technology will also be applied to other formats under future extensions to this specification, e.g. MPEG2 content specified by Entertainment Video Profile, as authorized by the 4C Entity, LLC.

1.5 Notation

Except where specifically noted otherwise, this document uses the same notations and conventions for numerical values, operations, and bit/byte ordering as described in the *Introduction and Common Cryptographic Elements* book of this specification.

Chapter 2
Abbreviations and Acronyms

2. Abbreviations and Acronyms

The following abbreviations and acronyms are used in this document:

4C	4 Companies (IBM, Intel, MEI, and Toshiba)
AKE	Authentication and Key Exchange
C-CBC	Converted Cipher Block Chaining
C2	Cryptomeria Cipher
CCI	Copy Control Information
CPRM	Content Protection for Recordable Media
ID	Identifier
LLC	Limited Liability Company
MKB	Media Key Block
SD	Secure Digital
TBD	To Be Determined
TK	Title Key
TKA	Title Key Area
TKURE	Title Key & Usage Rule Entry
TKURE_SRN	TKURE Search Number
TKURMG	Title Key & Usage Rule Manager
TKURMGI	Title Key & Usage Rule Manager Information
TKURMMG	Title Key & Usage Rule Master Manager
UR	Usage Rules

Chapter 3
CPRM for SD-Video

3. CPRM for SD-Video

3.1 Introduction

This chapter specifies details for using CPRM to protect SD-Video content stored on SD Memory Card media. This chapter describes details on using CPRM to realize "Move," "Copy," and "Playback" operations for SD-Video content.

The SD-Video and SD Memory Card formats can be licensed from the SD Association, which also publishes specifications describing them in detail (see the corresponding references in Section 1.1). This chapter assumes that readers are familiar with these formats, as defined in their corresponding specifications.

3.2 Device Requirements

Regarding the Device Requirements, refer to Section 3.2 of *SD Memory Card Book Common Part.*

3.3 CPRM Components

Regarding the CPRM Components, refer to Section 3.3 of *SD Memory Card Book Common Part.*

3.3.1 System Area

Regarding the System Area, refer to Section 3.3.1 of *SD Memory Card Book Common Part.*

3.3.1.1 Media Key Block (MKB)

In order to protect the Title Key and Usage Rules of SD-Video content, the "MKB for SD-Video" is used. The MKB number for SD-Video is described in the Supplementary Note of *SD Memory Card Specifications Part 3: Security Specification*.

3.3.2 Hidden Area

Regarding the Hidden Area, refer to Section 3.3.2 of *SD Memory Card Book Common Part.*

3.3.3 Protected Area

Regarding the Protected Area, refer to Section 3.3.3 of *SD Memory Card Book Common Part.*

In the case of SD-Video specifications, the Protected Area contains Encrypted Title Keys and Encrypted Usage Rules. The Title Key and Usage Rules of the content are concatenated and encrypted together by a Media Unique Key, which is unique for each SD Memory Card. The Encrypted Title Key and Usage Rules are stored as a file in the Protected Area. The file system of the Protected Area and the detail format of the Encrypted Title Key and Usage Rules are described in Section 3.7.

3.3.3.1 Encrypted Title Key

Regarding the Encrypted Title Key, refer to Section 3.3.3.1 of *SD Memory Card Book Common Part.*

3.3.3.2 Encrypted Usage Rules

Usage Rules (UR) consist of the following information:

- "Move Control Information": Usage Rule for controlling the Move operation.
- "Copy Count Control Information": Usage Rule for controlling the Copy operation.
- "Check Value": a fixed value placed at the end of the Usage Rules. This value is used for detecting whether the Title Key and Usage Rules are unexpectedly altered or not.

The detailed format of Usage Rules is described in Section 3.7.5.2.

3.3.4 User Data Area

Regarding the User Data Area, refer to Section 3.3.4 of *SD Memory Card Book Common Part.*

3.4 Content Encryption and Decryption Protocol

The SD-Video content, Title Keys and Usage Rules are encrypted/decrypted using almost the same encryption and decryption protocol as defined in Section 3.4 of *SD Memory Card Book Common Part.*

Figure 3-1 illustrates the process for SD-Video content encryption and decryption on "SD Memory Card."

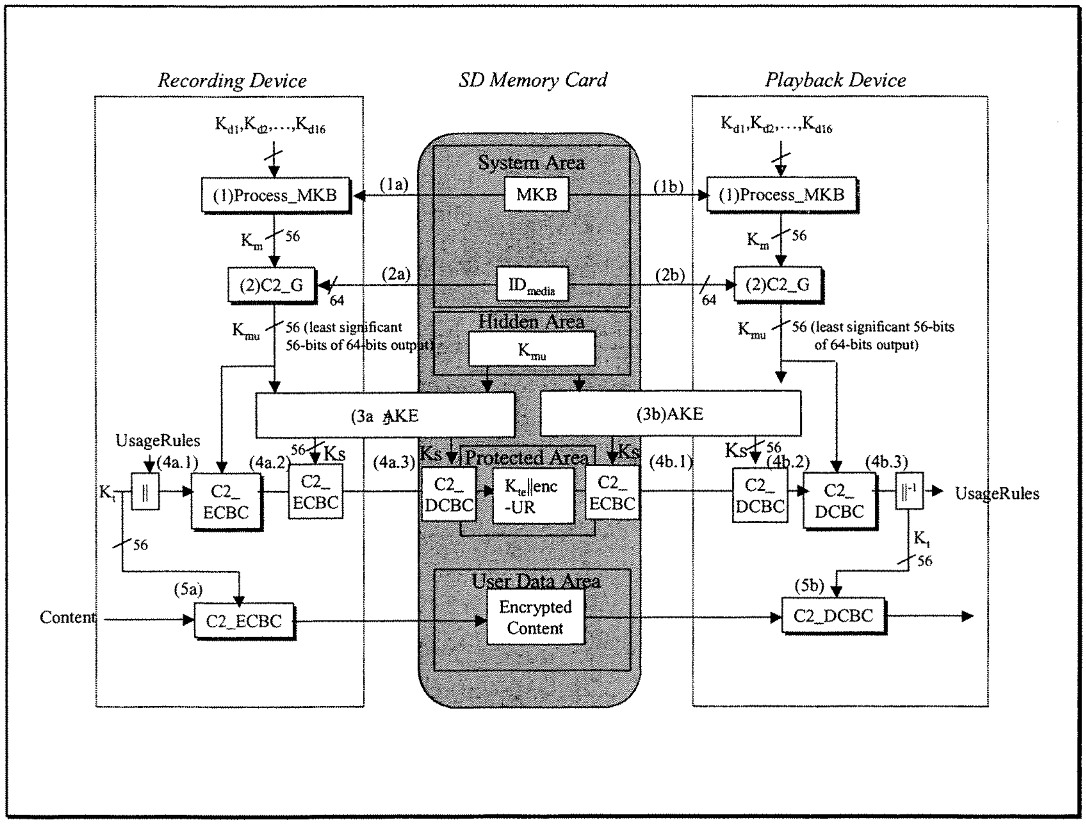


Figure 3-1 Content Encryption and Decryption on SD Memory Card

The SD Memory Card and the accessing device authenticate each other as follows:

- (1) The accessing device executes Process_MKB

(1a, 1b) Calculate Media Key from MKB using Device Key for MKB (see the *Introduction and Common Cryptographic Elements* book).

- (2) The accessing device executes the C2_G process

(2a, 2b) The same procedures defined in Section 3.4 (2) of *SD Memory Card Book Common Part* are used.

- (3) AKE process

(3a, 3b) The same procedures defined in Section 3.4.1of *SD Memory Card Book Common Part* are used.

-(4a) Title Key and Usage Rule Encryption process.

The following steps (4a.1) through (4a.3) describe the Title Key and Usage Rule Encryption Process.

When the content is encrypted, a Title Key is picked at random.

(4a.1) Encrypt the Title Key and Usage Rule Entry by the Media Unique Key associated with MKB.

The Recording Device encrypts the Title Key and Usage Rule Entry (see Table 3-8), as a single 64-byte encryption frame using the Media Unique Key associated with MKB. The encryption algorithm is C2_ECBC (the C2 cipher algorithm in C-CBC mode) which is described in the *Introduction and Common Cryptographic Elements* book.

(4a.2) Encrypt the Title Key and Usage Rule Entry by the Session Key.

The Recording Device further encrypts the entire 64-byte Title Key and Usage Rule Entry using the Session Key K_s, which is shared at step (3a), using C2_ECBC.

The results (the doubly-encrypted Title Key and Usage Rules) are sent to the SD Memory Card.

(4a.3) Decrypt the Title Key and Usage Rule Entry by the Session Key.

In the SD Memory Card, the doubly-encrypted 64-byte Title Key and Usage Rule Entry is decrypted using the Session Key K_s, which is shared at step (3a). The decryption algorithm is C2_DCBC (the C2 cipher algorithm in C-CBC mode) which is described in the *Introduction and Common Cryptographic Elements* book. The result (the encrypted Title Key and Usage Rule Entry) is stored in the Protected Area.

-(4b) Title Key and Usage Rule Decryption process.

The following steps (4b.1) through (4b.3) describe the Title Key and Usage Rule Decryption Process.

(4b.1) Encrypt the Title Key and Usage Rule Entry by the Session Key.

In the SD Memory Card, the 64-byte Title Key and Usage Rule Entry stored in the Protected Area is encrypted using the Session Key K_s, which is shared at step (3b), using C2_ECBC, and the result (the doubly-encrypted Title Key and Usage Rule Entry) is sent to the Playback Device.

(4b.2) Decrypt the Title Key and Usage Rule Entry by the Session Key.

The Playback Device decrypts the doubly-encrypted 64-byte Title Key and Usage Rule Entry using the Session Key K_s, which is shared at step (3b), using C2_DCBC.

(4b.3) Decrypt the Title Key and Usage Rule Entry by the Media Unique Key associated with MKB.

The Playback Device decrypts the 64-byte Title Key and Usage Rule Entry using the Media Unique Key associated with MKB, using C2_DCBC. Then the Playback Device gets the decrypted Title Key and Usage Rules..

-(5a) Content Encryption process

As for the content encryption process, the same procedures defined in Section 3.4 (5a) of *SD Memory Card Book Common Part* are used.

-(5b) Content Decryption process

As for the content decryption process, the same procedures defined in Section 3.4 (5b) of *SD Memory Card Book Common Part* are used.

3.5 Accessing the Protected Area

Regarding Accessing the Protected Area, refer to Section 3.5 of *SD Memory Card Book Common Part.*

3.6 Content Encryption and Decryption Format

Regarding the General Principle for Content Encryption and Decryption Format, refer to Section 3.6 of *SD Memory Card Book Common Part.*

3.6.1 SD-Video Object Encryption

3.6.1.1 ASF File Encryption

SD-Video application treats the Microsoft's Advanced Systems Format (ASF) file as one of the file format that contains video stream. The ASF file is encrypted by the Title Key as follows:

- The ASF file consists of an ASF Header Section, ASF Data Section Object (fixed to 50 bytes) and multiple ASF Data Packets.
- The ASF Header Section and the ASF Data Section Object are not encrypted.
- Each ASF Data Packet consists of a header part (variable size M: less than or equal to 40 bytes) and a data part (variable size N). Size of Data Packet is less than 2^32 bytes.
- Each ASF Data Packet is encrypted by the corresponding Title Key using C2_ECBC (the C2 cipher algorithm in C-CBC mode) as follows.
  - Each ASF Data Packet starts a new C-CBC cipher chain.
  - Forty(40) bytes from the top of each ASF Data Packet is not encrypted
  - The residual data part is encrypted. The last residual block, if it is less than 8 bytes, is not encrypted.

Table 3-1 and Table 3-2 show the encrypted ASF file Packet format.

Table 3-1 Encrypted ASF Data Packet format without residual block (M+N=8*n)

Bit Byte	7	6	5	4	3	2	1	0
0	40 bytes from the top of the ASF Data Packet (Non-Encrypted)							
1								
39								
40	Residual ASF Data Packet (Encrypted)							
41								
M+N-1								

Table 3-2 Encrypted ASF Data Packet format with residual block (M+N=8*n+m, m<8)

Bit Byte	7	6	5	4	3	2	1	0
0	40 bytes from the top of the ASF Data Packet (Non-Encrypted)							
1								
39								
40	Residual ASF Data Packet (8*n) (Encrypted)							
41								
8n+39								
8n+40	Last residual block (m<8)(Non-Encrypted)							
M+N-1								

3.6.1.2 MP4 File Encryption

SD-Video application treats MP4 file which is designed to contain the media information of an ISO/IEC 14496 presentation as one of the file format that contains video content stream. The MP4 file is encrypted by the Title Key as follows:

- The MP4 file consists of Movie Box(moov), Movie Fragment Box(moof), Media Data Box(mdat), and other miscellaneous boxes.
- Each Media Data Box(mdat) consists of a header part (8 or 16 bytes) and data part (variable size), and data part of Media Data Box(mdat) consists of some Chunks(variable size).
- Encryption of an MP4 file is done using C2_ECBC (the C2 cipher algorithm in C-CBC mode) with the corresponding Title Key as the encryption key.
- Movie Box(moov), Movie Fragment Box(moof) and other miscellaneous boxes are not encrypted.
- Each Chunk is encrypted and starts a new C-CBC mode cipher chain. But if Chunk size is larger than 2048 bytes, the cipher chain is reset every 2048 bytes offset.
- The last residual blocks of encryption parts, if they are less than 8 bytes, are not encrypted.

Table 3-3 and Table 3-4 show the encrypted Chunk.

Table 3-3 Encrypted Chunk without residual block (N=8*n)

Bit Byte	7	6	5	4	3	2	1	0
1	Chunk (Encrypted)							
2								
N								

Table 3-4 Encrypted Chunk with residual block (N=8*n+m, m<8)

Bit Byte	7	6	5	4	3	2	1	0
1	Chunk(8*n) (Encrypted)							
2								
8n								
8n+1	Residual block of Chunk (Non-Encrypted)							
N								

If Chunk size is larger than 2048 bytes, cipher chain in Chunk is reset every 2048 bytes as shown in Table 3-5. Each Encryption Block starts a new C-CBC mode cipher chain.

Table 3-5 Encrypted Chunk (N > 2048, N=8*n+m, m<8, N=2048*p+q, q<2048)

Bit Byte	7	6	5	4	3	2	1	0
1	Encryption block (Encrypted)							
2								
2048								
2049	Encryption block (Encrypted)							
4096								
	:							
2048p+1	Encryption block (Encrypted)							
8n								
8n+1	Residual block (Non-Encrypted)							
N								

3.7 File System of the Protected Area

This section shows the file system of the Protected Area. The physical allocation of the Protected Area is described in *SD Memory Card Specification –Part3 Security Specification.*

3.7.1 File System of the Protected Area for SD-Video

This section describes the file system of the Protected Area in which the encrypted Title Key (TK) and encrypted Usage Rules (UR) for SD-Video content are stored.

3.7.1.1 Title Key & Usage Rule Master Manager (TKURMMG)

A single master manager file manages all the Title Key & Usage Rule Manager files for SD-Video content in the Protected Area. The file is called Title Key & Usage Rule Master Manager (TKURMMG) file.

3.7.1.2 Title Key & Usage Rule Manager (TKURMG)

The Title Key and the Usage Rules for SD-Video content are encrypted by the Media Unique Key and stored in a file of the Protected Area. The file is called Title Key & Usage Rule Manager (TKURMG) file. In the Protected Area, there can be only one TKURMG files.

3.7.1.3 Directory and File Configuration in Protected Area

Figure 3-2 shows an example directory and file configuration of the Protected Area for the SD-Video specifications.

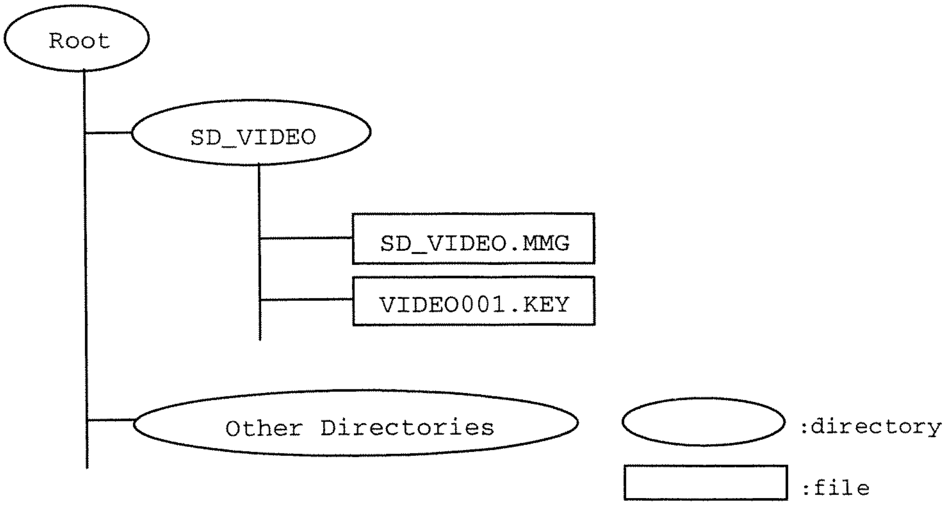


Figure 3-2 Directory and File Configuration

- The name of the TKURMMG file shall be "SD_VIDEO.MMG."

- The size of a TKURMG file is fixed. It contains 250 Title Key & Usage Rule Entries (TKUREs). In TKURMG file, only 99 entries are used, because the maximum number of Program that should be protected is 99.

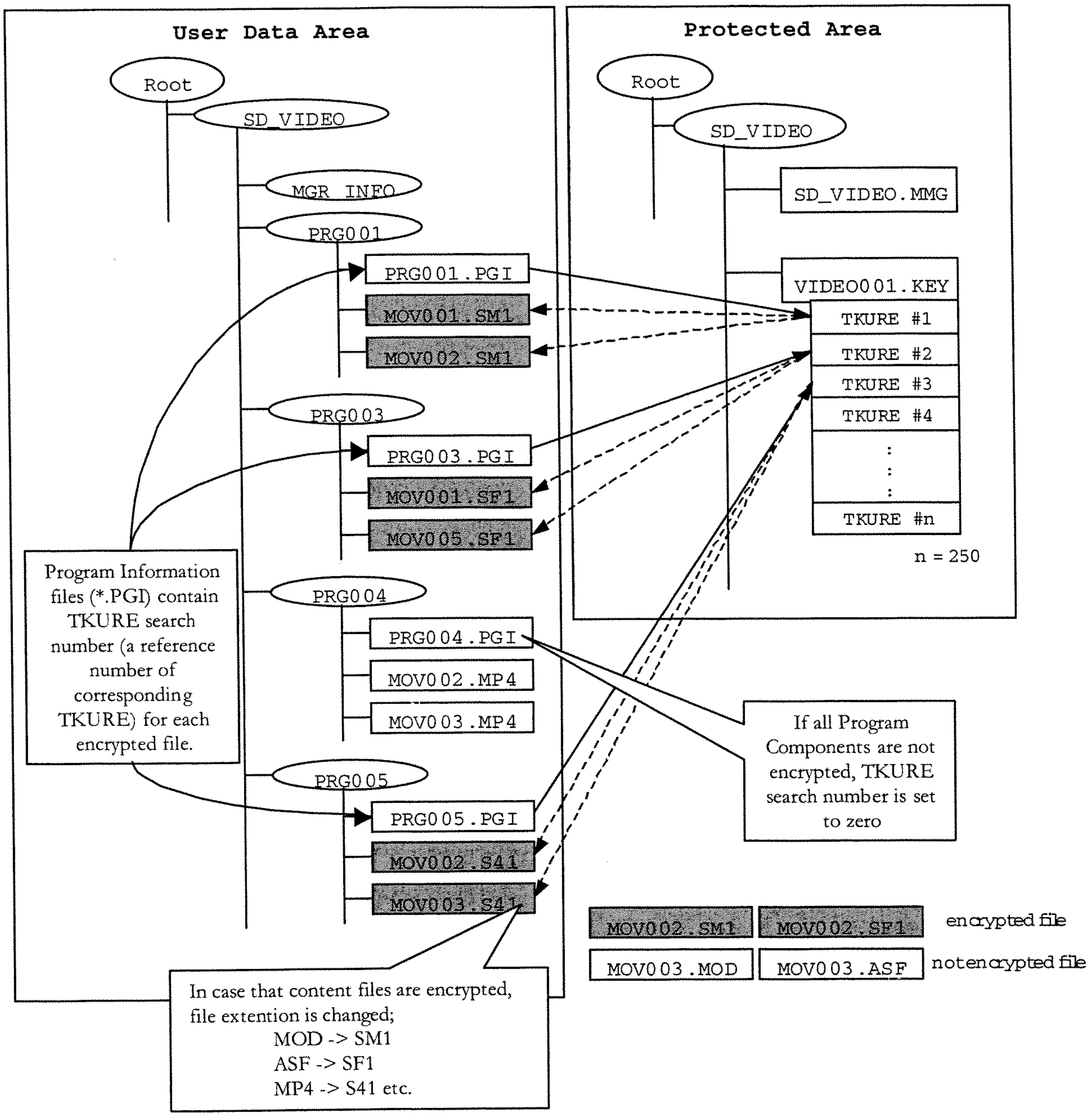
- The name of the TKURMG files shall be VIDEO001.KEY.

- The TKURE Search Number (TKURE_SRN) is a serial number uniquely associated with each TKURE of all the TKURMG files in SD_VIDEO directory. In other words, TKURE #1 to TKURE #99 in the VIDEO001.KEY file are associated with TKURE_SRN 1 to 99.

- Each encrypted content file in the User Data Area is associated with the corresponding TKURE in the Protected Area through its TKURE_SRN.

- Actually, the TKURE_SRN of the corresponding TKURE is stored in TkureIndex fields of the PRG_ATTR (Program Attribute) and PRG_INFO (Program Information) in the User Data Area. The two fields of PRG_ATTR and PRG_INFO shall have same value. Regarding the structure and the file names in the User Data Area, refer to *SD Memory Card Specifications, Part 8: Video Specifications.*

- If a content file in the User Data Area is not encrypted, the TkureIndex field in the corresponding PRG_INFO and PRG_INFO shall be set to 0. Otherwise, the TkureIndex field has TKURE_SRN, which shall be unique in the SD_VIDEO directory.



Program Information files (*.PGI) contain TKURE search number (a reference number of corresponding TKURE) for each encrypted file.

If all Program Components are not encrypted, TKURE search number is set to zero

In case that content files are encrypted, file extention is changed;

MOD -> SM1
ASF -> SF1
MP4 -> S41 etc.

Figure 3-3 Relationship between Directory and Filename

3.7.2 Structure of Title Key & Usage Rule Master Manager

As shown in Table 3-6, the TKURMMG consists of Version number, Application ID of TKURMG, and Used flag of each TKURMG.

Table 3-6 TKURMMG

(Description order)

RBP	Field Name	Contents	Number of bytes
0 to 1	VERN	Version number	2 bytes
2 to 3	TKURMG_AP_ID	Application ID of TKURMG	2 bytes
4 to 31	Reserved	Reserved	28 bytes
32	TKURMG_USED	TKURMG Used flag	1 bytes
33 to 63	Reserved	Reserved	31 bytes
Total			64 bytes

All reserved bits shall be set to '0.'

(RBP 0 to 1) VERN

This field describes the Version number of the SD-Video specification.

<table>
<tr><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>B11</td><td>b10</td><td>b9</td><td>b8</td></tr>
<tr><td colspan="8">Reserved</td></tr>
<tr><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr>
<tr><td colspan="8">Book part version</td></tr>
</table>

Book part version ... 11h : version 1.1

Others : reserved

(RBP 2 to 3) TKURMG_AP_ID

This field describes the Application ID of TKURMG. This value must be 4.

<table>
<tr><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>B11</td><td>b10</td><td>b9</td><td>b8</td></tr>
<tr><td colspan="8">Reserved</td></tr>
<tr><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr>
<tr><td colspan="8">Application ID</td></tr>
</table>

(RBP 32) TKURMG_USED

This field describes whether each TKURMG has unused TKUREs or not.

b7	b6	b5	b4	b3	b2	b1	b0
TKURMG Used flag_0	Reserved						

TKURMG Used flag_0 ... 1b: "VIDEO001 .KEY" exists and all the TKUREs of "VIDEO001 .KEY" are used.

0b: Ether "VIDEO001 .KEY" does not exist, or

"VIDEO001 .KEY" exists and has some unused TKUREs.

This flag shall be always 0.

3.7.3 Structure of Title Key & Usage Rule Manager

Figure 3-4 shows the structure of a Title Key & Usage Rule Manager (TKURMG).

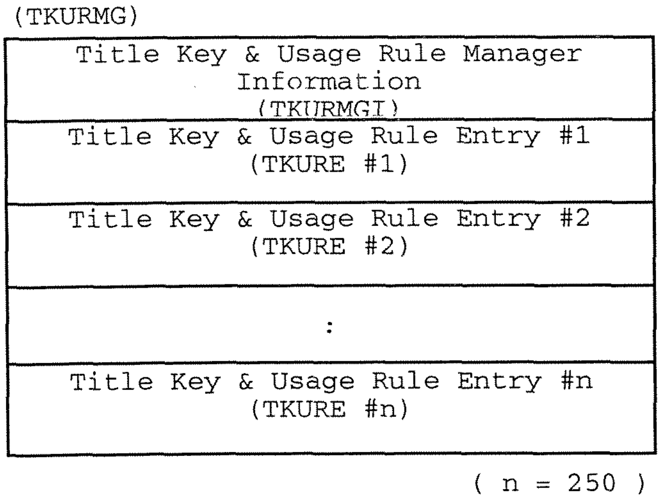

(TKURMG)
Title Key & Usage Rule Manager Information (TKURMGI)
Title Key & Usage Rule Entry #1 (TKURE #1)
Title Key & Usage Rule Entry #2 (TKURE #2)
:
Title Key & Usage Rule Entry #n (TKURE #n)
(n = 250)

Figure 3-4 Title Key & Usage Rule Manager (TKURMG)

A TKURMG file starts with a Title Key & Usage Rule Manager Information (TKURMGI), followed by a set of Title Key & Usage Rule Entries (TKUREs). TKURE number is from 1 to 250, but TKURE numbers from 100 to 250 are not used

3.7.4 Title Key & Usage Rule Manager Information (TKURMGI)

As shown in Table 3-7, the TKURMGI consists of Used flag of each TKURE in the TKURMG.

Table 3-7 TKURMGI

(Description order)

RBP	Field Name	Contents	Number of bytes
0 to 31	TKURE_USED	TKURE Used flag	32 bytes
32 to 383	Reserved	Reserved	352 bytes
Total			384 bytes

All reserved bits shall be set to '0.'

(RBP 0 to 31) TKURE_USED

This field describes whether each TKURE in this TKURMG is used or not.

b255	b254	b253	b252	b251	b250	b249	b248
TKURE Used flag [0 .. 7]							

b247	b246	b245	b244	b243	b242	b241	b240
TKURE Used flag [8 .. 15]							

:

b159	b158	b157	b156	b155	b154	b153	b152
TKURE Used flag [96 .. 98]			reserved				

:

b7	b6	b5	b4	b3	b2	b1	b0
reserved							

TKURE Used flag [*j*] ... 0b: TKURE # *j+1* in this TKURMG is not used.

(TKURE # *j+1* is vacant.)

1b: TKURE # *j+1* in this TKURMG is used.

(TKURE # *j+1* is not vacant.)

3.7.5 Title Key & Usage Rule Entry (TKURE)

As shown in Table 3-8, a TKURE field contains Title Key Area (TKA) and Usage Rules (UR) of the corresponding encrypted content. The whole TKURE is encrypted using C2_ECBC (both fields are concatenated and then encrypted using C2_ECBC).

Table 3-8 TKURE

(Description order)

RBP	Field Name	Contents	Number of bytes
0 to 7	TKA	Title Key Area	8 bytes
8 to 63	UR	Usage Rules	56 bytes
Total			64 bytes

3.7.5.1 Title Key Area (TKA)

As shown in Table 3-9, TKA contains EKEY field. This field describes the Title Key of the corresponding encrypted content.

Table 3-9 TKA

(Description order)

RBP	Field Name	Contents	Number of bytes
0	Reserved	Reserved	1 byte
1 to 7	EKEY	Title Key	7 bytes
Total			8 bytes

b63	b62	b61	b60	b59	b58	b57	b56
Reserved							
b55	b54	b53	b52	b51	b50	b49	b48
EKEY [55 .. 48]							
b47	b46	b45	b44	b43	b42	b41	b40

EKEY [47 .. 40]							
b39	b38	b37	b36	b35	b34	b33	b32
EKEY [39 .. 32]							
b31	b30	b29	b28	b27	b26	b25	b24
EKEY [31 .. 24]							
b23	b22	b21	b20	b19	b18	b17	b16
EKEY [23 .. 16]							
b15	b14	b13	b12	b11	b10	b9	b8
EKEY [15 .. 8]							
b7	b6	b5	b4	b3	b2	b1	b0
EKEY [7 .. 0]							

EKEY ... Stores the Title Key.

All reserved bits (from b56 to b63) shall be set to '0.' For forward compatibility, devices shall ignore non-zero values in these reserved fields.

3.7.5.2 Usage Rules (UR)

As shown in Table 3-10, Usage Rules (UR) consists of Trigger Bit Information, Initial Move Control Information, Current Move Control Information, Copy Count Control Information, and Check Value.

Table 3-10 UR

(Description order)

RBP	Field Name	Contents	Number of bytes
0	UR_TRIGGER	Trigger Bit Information	1 byte
1	UR_MCCNTRL	Initial Move Control Information / Current Move Control Information / Copy Count Control Information	1 byte
2 to 47	Reserved	Reserved	46 bytes
48 to 55	UR_CHECK	Check Value	8 bytes
Total			56 bytes

All reserved bits shall be set to '0.' For forward compatibility, devices shall ignore non-zero values in these reserved fields, unless otherwise specified.

In the following definition of Usage Rule fields, the assigned values are effective only when the TKURE is used. When the TKURE is not used, no specific value is assigned to each Usage Rule field.

(RBP 0) UR_TRIGGER

This field describes Trigger Bit Information.

b7	b6	b5	b4	b3	B2	b1	b0
Trigger bit	reserved						

Trigger bit ... 0b : Accessing devices conforming to this specification can control the Move/Copy/Playback processes.

1b : Accessing devices conforming to this specification shall not be permitted the Move/Copy/Playback processes.

Accessing devices conforming to this specification shall always set this Trigger bit value to '0b' when writing an encrypted content to an SD Memory Card.

In a future version, the Usage Rules may be expanded, or other information for controlling these processes may be added. Accessing devices of the future version shall process the new information for controlling these processes correctly when this bit is set to '1b.'

(RBP 1) UR_MCCNTRL

This field describes the Initial Move Control Information, Current Move Control Information, and Copy Count Control Information.

b7	b6	b5	B4	b3	b2	b1	b0
Initial Move Control Information		Current Move Control Information		Copy Count Control Information			

Initial Move Control Information ... 00b : Move is never permitted.

01b : Move is permitted once.

11b : Move is permitted unlimited times.

others : Reserved.

The Initial Move Control Information is set when the corresponding content is distributed. It never changes even when the content is moved. This field is inherited to a replicated content when copying.

Current Move Control Information ... 00b : Move is never permitted.

01b : Move is permitted once.

11b : Move is permitted unlimited times.

others : Reserved.

The Current Move Control Information changes when the corresponding content is moved. As for the details how conforming devices shall change this field, refer to the Move process described in Section 3.8 *Process Description* of this specification.

Copy Count Control Information ... 0000b : Copy is never permitted.

0001b~1110b : Copy is permitted specified times.

1111b : Copy is permitted unlimited times.

The Copy Count Control Information changes when the corresponding content is copied. When copying is executed, this field of an originated content shall be decremented, and that of a replicated content shall be set to '0000b.' As for the details how conforming devices shall change this field, refer to the Copy process described in Section 3.8 *Process Description* of this specification.

(RBP 48 to 55) UR_CHECK

This field stores the 64-bit check value, '0123456789ABCDEFh.'

3.8 Process Description

This section describes Recording, Erasing, Copy, Move and Playback processes.

- Recording Process

Specifies how a Recording Device (e.g. Kiosk) writes CPRM protected SD-Video content to an SD Memory Card.

- Erasing Process

Specifies how an Erasing Device erases CPRM protected SD-Video content from an SD Memory Card.

- Copy Process I (from SD Memory Card to Host)

Specifies how CPRM protected SD-Video content on an SD Memory Card is copied securely to a Destination Device (e.g. personal computer).

- Copy Process II (from Host to SD Memory Card)

Specifies how CPRM protected SD-Video content on a Source Device is copied securely to an SD Memory Card.

- Move Process I (from SD Memory Card to Host)

Specifies how CPRM protected SD-Video content on an SD Memory Card is copied securely to a Destination Device (e.g. personal computer) and how it is made permanently unusable on the SD Memory Card.

- Move Process II (from Host to SD Memory Card)

Specifies how CPRM protected SD-Video content on a Source Device is copied securely to an SD Memory Card and how it is made permanently unusable on the Source Device.

- Playback Process

Specifies how CPRM protected SD-Video content on an SD Memory Card is played back by a Playback Device in conformance with the content's Usage Rules.

When aborting or terminating each process, the processing device shall delete all the temporary images of TKURE/TKURMG/TKURMMG, which are either read from the SD Memory Card or created on the device.

In addition, following sub-processes are used in each process described in this section. As for the details for these processes, see the corresponding references.

- 'Secure Read Process' is described in *SD Memory Card Book Common Part* Section 3.5.
- 'Secure Write Process' is described in *SD Memory Card Book Common Part* Section 3.5.
- ' TKURE Encryption Process (Title Key & Usage Rule Encryption Process)' is described in Section 3.4 (step (4a.1)) of this specification.
- ' TKURE Decryption Process (Title Key & Usage Rule Decryption Process)' is described in Section 3.4 (step (4b.3)) of this specification.

3.8.1 Recording Process

The Recording Device securely holds information associated with SD-Video content to be recorded. The information includes the Usage Rules given by a Content Provider and a Title Key that has a secret unpredictable value (e.g. given by the Content Provider or selected at random).

(1) Read the TKURMMG file from the SD Memory Card.

The Recording Device securely reads the TKURMMG file from the SD Memory Card using the Secure Read Process and holds it as the temporary TKURMMG image.

(2) Read or create a TKURMG.

(2.1) Select a TKURMG file that has at least one unused TKURE.

The Recording Device checks the TKURMG Used flag (TKURMG_USED) field in the temporary TKURMMG image. The Recording Device selects the first TKURMG file whose TKURMG Used flag is equal to '0b.' If all the TKURMG Used flags are equal to '1b,' the process shall be aborted.

(2.2) Read the selected TKURMG file from the SD Memory Card or create a temporary TKURMG image on the Recording Device.

The Recording Device checks whether the selected TKURMG file exists or not.

(a) When the selected TKURMG file exists, the Recording Device securely reads the selected TKURMG file from the SD Memory Card using the Secure Read Process and holds it as the temporary TKURMG image.

(b) When the selected TKURMG file does not exist, the Recording Device creates a new TKURMG image on the Recording Device.

(3) Update the temporary TKURMG and TKURMMG image.

(3.1) Update the TKURE in the temporary TKURMG image.

The Recording Device checks the TKURE Used flag (TKURE_USED) in the temporary TKURMG image, and finds the first unused TKURE.

The Recording Device updates the unused TKURE in the temporary TKURMG image as follows:

- The Initial Move Control Information and Copy Count Control Information of the TKURE are set to the value specified by the Content Provider.
- The Current Move Control Information is set to the same value as that of the Initial Move Control Information specified by the Content Provider.
- The Trigger bit is set to '0b.'
- The Check Value is set to '0123456789ABCDEFh.'

After all the fields in the unused TKURE are set as above, the Recording Device encrypts the TKURE in the temporary TKURMG image using the TKURE Encryption process.

(3.2) Set the TKURE_USED in the temporary TKURMG image and the TKURMG_USED in the temporary TKURMMG image.

The Recording Device sets the TKURE Used flag associated with the updated TKURE in the temporary TKURMG image to '1b.'

In addition, when all the TKURE Used flags are equal to '1b' (all the TKUREs in the temporary TKURMG image have been used), the TKURMG Used flag associated with the selected TKURMG file in the temporary TKURMMG image shall be set to '1b.'

(4) Write the updated temporary TKURMG and TKURMMG image to the SD Memory Card.

The Recording Device securely writes the updated temporary TKURMG image held in the Recording Device as the updated TKURMG file to the SD Memory Card using the Secure Write Process. When a new TKURMG image was created in step (2.2), the updated temporary TKURMG image is written as a new TKURMG file using the Secure Write Process.

In addition, if the temporary TKURMMG image is updated in step (3.2), the Recording Device securely writes the updated temporary TKURMMG image held in the Recording Device as the updated TKURMMG file to the SD Memory Card using the Secure Write Process.

To protect against the "Pull Card Attack," the Recording Device must assume that the Recording Process has been completely done, even if errors occur in step (4).

3.8.2 Erasing Process

(1) Determine the TKURMG file and TKURE associated with the content to be erased.

(1.1) Obtain TKURE_SRN.

The Erasing Device obtains the TKURE_SRN s associated with the content to be erased.

(1.2) Determine the TKURMG file and TKURE associated with the content to be erased.

The Erasing Device determines the TKURMG filename and the TKURE using the following formula:

$s = (\boldsymbol{n} - 1) * 250 + \boldsymbol{m}$ ($\boldsymbol{n}$: TKURMG file number, $\boldsymbol{m}$: TKURE number in a TKURMG)

$1 \leq \boldsymbol{m} \leq 250$, $1 \leq \boldsymbol{n} \leq 256$

Because s is less than or equal to 99, $\boldsymbol{n}$ is always 1 and $\boldsymbol{m}$ is equal to s.

(2) Read the TKURMG file from the SD Memory Card.

The Erasing Device securely reads the ***n***th TKURMG file from the SD Memory Card using Secure Read Process and holds it as the temporary TKURMG image.

Then, the Erasing Device checks the ***m***th TKURE Used flag in the temporary TKURMG image. If it is equal to '0b,' the process shall be aborted.

Otherwise, the Erasing Device obtains the ***m***th TKURE in the temporary TKURMG image.

(3) Check the TKURE in the temporary TKURMG image.

The Erasing Device decrypts the TKURE using the TKURE Decryption process and securely holds it as the decrypted TKURE image. The Erasing Device checks this decrypted TKURE image.

- If the Check Value is not '0123456789ABCDEFh,' the process shall be aborted.
- If the Trigger bit is '1b,' the process shall be aborted.

(4) Update the temporary TKURMG and TKURMMG image.

The Erasing Device overwrites this TKURE in the temporary TKURMG image with "the value for delete (random number)."

The Erasing Device shall set the TKURE Used flag associated with the TKURE in the temporary TKURMG image to '0b.'

In addition, the Erasing Device checks all the TKURE Used flags in the temporary TKURMG image.

(a) When all the TKURE Used flags are equal to '0b,' the Erasing Device deletes the selected TKURMG file from the Protected Area of the SD Memory Card, and then considers this process to be successfully terminated.

(b) When all the TKURE Used flags other than the one associated with the overwritten TKURE are equal to '1b,' the Erasing Device securely reads the TKURMMG file from the SD Memory Card using Secure Read Process and holds it as the temporary TKURMMG image. Then the Erasing Device sets the ***n***th TKURMG Used flag in the temporary TKURMMG image to '0b.'

(5) Write the updated temporary TKURMG and TKURMMG image to the SD Memory Card.

The Erasing Device securely writes the updated temporary TKURMG image as the updated TKURMG file to the SD Memory Card using the Secure Write Process. Then the Erasing Device securely reads the updated TKURMG file from the SD Memory Card using the Secure Read Process and verifies that the value of the ***m***th TKURE in the TKURMG file is equal to "the value for delete (random number)" used in step (4). If the verification of the TKURMG file fails, the Erasing Device shall abort this process.

In addition, if the temporary TKURMMG image was updated in step (4b), the Erasing Device securely writes the updated temporary TKURMMG image as the updated TKURMMG file to the SD Memory Card using the Secure Write Process.

3.8.3 Copy Process I (from SD Memory Card to Host)

(1) Determine the TKURMG file and TKURE associated with the content to be copied.

(1.1) Obtain TKURE_SRN.

The Destination Device obtains the TKURE_SRN s associated with the content to be copied.

(1.2) Determine the TKURMG file and TKURE associated with the content to be copied.

The Destination Device determines the TKURMG filename and the TKURE using the following formula:

$s = (\boldsymbol{n} - 1) * 250 + \boldsymbol{m}$ ($\boldsymbol{n}$: TKURMG file number, $\boldsymbol{m}$: TKURE number in a TKURMG)

$1 \leq \boldsymbol{m} \leq 250,\ 1 \leq \boldsymbol{n} \leq 256$

Because s is less than or equal to 99, $\boldsymbol{n}$ is always 1 and $\boldsymbol{m}$ is equal to s.

(2) Read the TKURMG file from the SD Memory Card.

The Destination Device securely reads the ***n***th TKURMG file from the SD Memory Card using Secure Read Process and holds it as the temporary TKURMG image.

Then, the Destination Device checks the ***m***th TKURE Used flag in the temporary TKURMG image. If it is equal to '0b,' the process shall be aborted.

Otherwise, the Destination Device obtains the ***m***th TKURE in the temporary TKURMG image.

(3) Check the TKURE in the temporary TKURMG image.

The Destination Device decrypts the TKURE using the Title Key and Usage Rule Decryption process described in Section 3.4 of this specification, and securely holds it as the decrypted TKURE image. The Destination Device checks this decrypted TKURE image.

- If the Check Value is not '0123456789ABCDEFh,' the process shall be aborted.
- If the Trigger bit is '1b,' the process shall be aborted.
- If the Copy Count Control Information is equal to '0000b,' the process shall be aborted.
- If the Copy Count Control Information is equal to '1111b,' then go to step (6).

(4) Update the decrypted TKURE image.

The Destination Device decrements the value of Copy Count Control Information of the decrypted TKURE image. Then the Destination Device encrypts this decrypted TKURE image using the TKURE Encryption process, and sets the ***m***th TKURE in the temporary TKURMG image to the resulting value.

(5) Write the updated temporary TKURMG image to the SD Memory Card.

The Destination Device securely writes the updated temporary TKURMG image as the updated TKURMG file to the SD Memory Card using the Secure Write Process. Then the Destination Device securely reads the updated TKURMG file from the SD Memory Card using the Secure Read Process and verifies that the update of the ***m***th TKURE in the TKURMG file has completed successfully.

If the verification of the TKURMG file fails, the Destination Device shall abort this process.

(6) Update the Usage Rules on the Destination Device.

The Destination Device temporarily holds the decrypted TKURE image as the associated Title Key and Usage Rules for the copied content on the Destination Device.

The Destination Device updates those Usage Rule fields as follows:

- The Copy Count Control Information is set to '0000b.'
- The Current Move Control Information field is set to the same value as that of the Initial Move Control Information field.

When all of the above steps are executed successfully, the Destination Device securely holds the Title Key and the updated Usage Rules as the associated Title Key and Usage Rules for the copied content.

3.8.4 Copy Process II (from Host to SD Memory Card)

The Source Device securely holds information associated with SD-Video content to be copied. The information includes the Usage Rules and a secret unpredictable Title Key.

(1) Check the Usage Rules on the Source Device.

The Source Device checks the Usage Rules securely held in it.

- If the Copy Count Control Information is equal to '0000b,' then the process shall be aborted.

(2) Read the TKURMMG file from the SD Memory Card.

The Source Device securely reads the TKURMMG file from the SD Memory Card using the Secure Read Process and holds it as the temporary TKURMMG image.

(3) Read or create a TKURMG.

(3.1) Select a TKURMG file that has at least one unused TKURE.

The Source Device checks the TKURMG Used flag (TKURMG_USED) field in the temporary TKURMMG image. The Source Device selects the first TKURMG file whose TKURMG Used flag is equal to '0b.' If all the TKURMG Used flags are equal to '1b,' the process shall be aborted.

(3.2) Read the selected TKURMG file from the SD Memory Card or create a temporary TKURMG image on the Source Device.

The Source Device checks whether the selected TKURMG file exists or not.

(a) When the selected TKURMG file exists, the Source Device securely reads the selected TKURMG file from the SD Memory Card using the Secure Read Process and holds it as the temporary TKURMG image.

(b) When the selected TKURMG file does not exist, the Source Device creates a new TKURMG image on the Source Device.

(4) Update the temporary TKURMG and TKURMMG image.

(4.1) Update the TKURE in the temporary TKURMG image.

The Source Device checks the TKURE Used flag (TKURE_USED) in the temporary TKURMG image, and finds the first unused TKURE.

The Source Device updates the unused TKURE in the temporary TKURMG image as follows:

- The Copy Count Control Information of the TKURE is set to '0000b.'
- The Initial Move Control Information field of the TKURE is set to the same value as that of the Initial Move Control Information field of the Usage Rules held in the Source Device. The Current Move Control Information field of the TKURE is set to the same value as that of the Initial Move Control Information field of the Usage Rules held in the Source Device.
- The Trigger bit of the TKURE is set to '0b.'
- The Check Value of the TKURE is set to '0123456789ABCDEFh.'

After all the fields in the unused TKURE are set as above, the Source Device encrypts the TKURE in the temporary TKURMG image using the TKURE Encryption process.

(4.2) Set the TKURE_USED in the temporary TKURMG image and the TKURMG_USED in the temporary TKURMMG image.

The Source Device sets the TKURE Used flag associated with the updated TKURE in the temporary TKURMG image to '1b.'

In addition, when all the TKURE Used flags are equal to '1b' (all the TKUREs in the temporary TKURMG image have been used), the TKURMG Used flag associated with the selected TKURMG file in the temporary TKURMMG image shall be set to '1b.'

(5) Update the Usage Rules on the Source Device

If the Copy Count Control Information held in the Source Device is not equal to '1111b,' the Source Device decrements the value of the Copy Count Control Information held in it.

(6) Write the updated temporary TKURMG and the TKURMMG image to the SD Memory Card.

The Source Device securely writes the updated temporary TKURMG image held in the Source Device as the updated TKURMG file to the SD Memory Card using the Secure Write Process. When a new TKURMG image was created in step (3.2), the updated temporary TKURMG image is written as a new TKURMG file using the Secure Write Process.

In addition, if the TKURMMG image was updated in step (4.2), the Source Device securely writes the updated temporary TKURMMG image held in the Source Device as the updated TKURMMG file to the SD Memory Card using the Secure Write Process.

To protect against the "Pull Card Attack," the Source Device must assume that the Copy Process II has been completely done, even if errors occur in step (6).

3.8.5 Move Process I (from SD Memory Card to Host)

(1) Determine the TKURMG file and TKURE associated with the content to be moved.

(1.1) Obtain TKURE_SRN.

The Destination Device obtains the TKURE_SRN s associated with the content to be moved.

(1.2) Determine the TKURMG file and TKURE associated with the content to be moved.

The Destination Device determines the TKURMG filename and the TKURE using the following formula:

$s = (\boldsymbol{n} - 1) * 250 + \boldsymbol{m}$ ($\boldsymbol{n}$: TKURMG file number, $\boldsymbol{m}$: TKURE number in a TKURMG)

$1 \leq \boldsymbol{m} \leq 250,\ 1 \leq \boldsymbol{n} \leq 256$

Because s is less than or equal to 99, $\boldsymbol{n}$ is always 1 and $\boldsymbol{m}$ is equal to s.

(2) Read the TKURMG file from the SD Memory Card.

The Destination Device securely reads the ***n***th TKURMG file from the SD Memory Card using Secure Read Process and holds it as the temporary TKURMG image.

Then, the Destination Device checks the ***m***th TKURE Used flag in the temporary TKURMG image. If it is equal to '0b,' the process shall be aborted.

Otherwise, the Destination Device obtains the ***m***th TKURE in the temporary TKURMG image.

(3) Check the TKURE in the temporary TKURMG image.

The Destination Device decrypts the TKURE using the TKURE Decryption process and securely holds it as the decrypted TKURE image. The Destination Device checks this decrypted TKURE image.

- If the Check Value is not '0123456789ABCDEFh,' the process shall be aborted.
- If the Trigger bit is '1b,' the process shall be aborted.
- If the Current Move Control Information is equal to '00b,' the process shall be aborted.

(4) Update the temporary TKURMG and TKURMMG image.

The Destination Device securely overwrites the TKURE in the temporary TKURMG image with "the value for delete (random number)."

The Destination Device shall set the TKURE Used flag associated with the TKURE in the temporary TKURMG image to '0b.'

In addition, the Destination Device checks all the TKURE Used flags in the temporary TKURMG image.

(a) When all the TKURE Used flags are equal to '0b,' the Destination Device deletes the selected TKURMG file from the Protected Area of the SD Memory Card. Then go to step (6).

(b) When all the TKURE Used flags other than the one associated with the overwritten TKURE are equal to '1b,' the Destination Device securely reads the TKURMMG file from the SD Memory Card using Secure Read Process and holds it as the temporary TKURMMG image. Then the Destination Device sets the ***n***th TKURMG Used flag in the temporary TKURMMG image to '0b.'

(5) Write the updated temporary TKURMG and TKURMMG image to the SD Memory Card.

The Destination Device securely writes the updated temporary TKURMG image as the updated TKURMG file to the SD Memory Card using the Secure Write Process. Then the Destination Device securely reads the updated TKURMG file from the SD Memory Card using the Secure Read Process and verifies that the value of the ***m***th TKURE in the TKURMG file is equal to "the value for delete (random number)" used in step (4). If the verification of the TKURMG file fails, the Destination Device shall abort this process.

In addition, if the temporary TKURMMG image was updated in step (4b), the Destination Device securely writes the updated temporary TKURMMG image as the updated TKURMMG file to the SD Memory Card using the Secure Write Process.

(6) Update the Usage Rules on the Destination Device.

The Destination Device temporarily holds the decrypted TKURE image as the associated Title Key and Usage Rules for the moved content on the Destination Device.

- When the Current Move Control Information in the decrypted TKURE image is equal to '01b,' the Destination Device sets the value of the Current Move Control Information field to '00b.'

When all of the above steps are executed successfully, the Destination Device securely holds the Title Key and Usage Rules as the associated Title Key and Usage Rules for the moved content.

3.8.6 Move Process II (from Host to SD Memory Card)

The Source Device securely holds information associated with SD-Video content to be moved. The information includes the Usage Rules and a secret unpredictable Title Key.

(1) Check the Usage Rules on the Source Device.

The Source Device checks the Usage Rules securely held in it.

- If the Current Move Control Information is equal to '00b,' then the process shall be aborted.

(2) Read the TKURMMG file from the SD Memory Card.

The Source Device securely reads the TKURMMG file from the SD Memory Card using the Secure Read Process and holds it as the temporary TKURMMG image.

(3) Read or create a TKURMG.

(3.1) Select a TKURMG file that has at least one unused TKURE.

The Source Device checks the TKURMG Used flag (TKURMG_USED) field of the temporary TKURMMG image. The Source Device selects the first TKURMG file whose TKURMG Used flag is equal to '0b.' If all the TKURMG Used flags are equal to '1b,' the process shall be aborted.

(3.2) Read the selected TKURMG file from the SD Memory Card or create a temporary TKURMG image on the Source Device.

The Source Device checks whether the selected TKURMG file exists or not.

(a) When the selected TKURMG exists, the Source Device securely reads the selected TKURMG file from the SD Memory Card using the Secure Read Process and holds it as the temporary TKURMG image.

(b) When the selected TKURMG does not exist, the Source Device creates a new TKURMG image on the Source Device.

(4) Update the temporary TKURMG and TKURMMG image.

(4.1) Update the TKURE in the temporary TKURMG image.

The source device checks the TKURE Used flag (TKURE_USED) in the temporary TKURMG image, and finds the first unused TKURE.

The Source Device updates the unused TKURE in the temporary TKURMG image as follows:

- The Copy Count Control Information of the TKURE is set to the same value as that of the Copy Count Control Information of the Usage Rules held in the Source Device.
- The Initial Move Control Information field of the TKURE is set to the same value as that of the Initial Move Control Information field of the Usage Rules held in the Source Device. The Current Move Control Information field of the TKURE is set to the same value as that of the Current Move Control Information field of the Usage Rules held in the Source Device.
- The Trigger bit of the TKURE is set to '0b.'
- The Check Value of the TKURE is set to '0123456789ABCDEFh.'

After all the fields in the unused TKURE are set as above, the Source Device encrypts the TKURE in the temporary TKURMG image using the TKURE Encryption process.

(4.2) Set the TKURE_USED in the temporary TKURMG image and the TKURMG_USED in the temporary TKURMMG image.

The Source Device sets the TKURE Used flag associated with the updated TKURE in the temporary TKURMG image to '1b.'

In addition, when all the TKURE Used flags are equal to '1b' (all the TKUREs in the temporary TKURMG image have been used), the TKURMG Used flag associated with the selected TKURMG file in the temporary TKURMMG image shall be set to '1b.'

(5) Make the original content held in the Source Device unusable.

The Source Device makes the original SD-Video content held in it permanently unusable.

(6) Write the updated temporary TKURMG image and the TKURMMG image to the SD Memory Card.

The Source Device securely writes the updated temporary TKURMG image held in the Source Device as the updated TKURMG file to the SD Memory Card using the Secure Write Process. When a new TKURMG image was created in step (3.2), the updated temporary TKURMG image is written as a new TKURMG file using the Secure Write Process.

In addition, if the TKURMMG image was updated in step (4.2), the Source Device securely writes the updated temporary TKURMMG image held in the Source Device as the updated TKURMMG file to the SD Memory Card using the Secure Write Process.

To protect against the "Pull Card Attack," the Source Device must assume that the Move Process II has been completely done, even if errors occur in step (6).

3.8.7 Playback Process

(1) Determine the TKURMG file and TKURE associated with the content to be played back.

(1.1) Obtain TKURE_SRN.

The Playback Device obtains the TKURE_SRN *s* associated with the content to be played back.

(1.2) Determine the TKURMG file and TKURE associated with the content to be played back.

The Playback Device determines the TKURMG filename and the TKURE using the following formula:

$s = (n - 1) * 250 + m$ (n: TKURMG file number, m: TKURE number in a TKURMG)

$1 \leq m \leq 250$, $1 \leq n \leq 256$

Because s is less than or equal to 99, n is always 1 and m is equal to s.

(2) Read the TKURMG file from the SD Memory Card.

The Playback Device securely reads the ***n***th TKURMG file from the SD Memory Card using Secure Read Process and holds it as the temporary TKURMG image.

Then, the Playback Device checks the ***m***th TKURE Used flag in the temporary TKURMG image. If it is equal to '0b,' the process shall be aborted.

Otherwise, the Playback Device obtains the ***m***th TKURE in the temporary TKURMG image.

(3) Check the TKURE.

The Playback Device decrypts the TKURE using the TKURE Decryption process and securely holds it as the decrypted TKURE image. The Playback Device checks the decrypted TKURE image.

- If the Check Value is not '0123456789ABCDEFh,' then the process shall be aborted.
- If the Trigger bit field is '1b,' then the process shall be aborted.

(4) Start Playback

The PlaybackDevice starts playback of the content.

3.9 MKB Extensions for SD-Video

The MKB Extension file configuration in the User Date Area for SD-Video is as follows:

The directory name in which the MKB Extension file is located is "SD_VIDEO", and the name of the MKB Extension file is "SD_VIDEO.MKB."